



## Instructions for

### 3-WAY ROTARY CONTROL VALVES

4" THROUGH 16" SIZE CLASSES RVK AND RVB

#### INSTALLATION, OPERATION, AND MAINTENANCE

##### INSTALLATION

Valve may be installed in any position in an accessible location allowing sufficient space above below and around valve for easy removal of parts during maintenance

3-Way Rotary Valves may be used for converging or diverging service

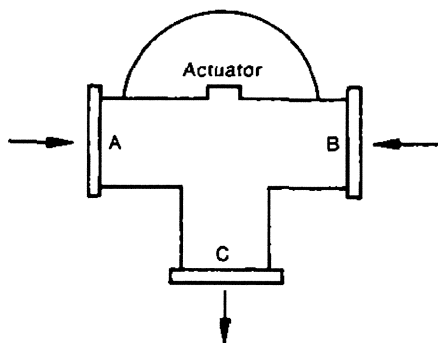


Figure 1 Converging (Mixing)

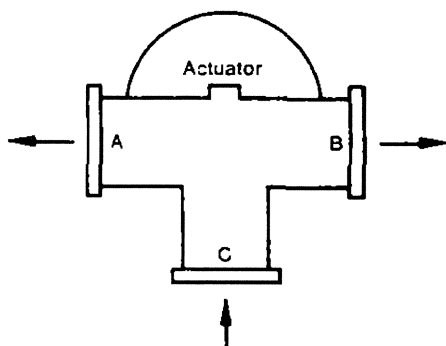


Figure 2 Diverging

**NOTE** To facilitate removal of rotor from "C" connection of body without removing valve from pipe line a removable adaptor or spool piece may be used between connecting piping and flange "C" of body. Spool piece should be a minimum of valve size plus sixteen (16) inches in length. Example Valve Size - 14 inches 14 plus 16 inches equals a minimum length of 30 inches therefore spool piece should be 30 inches from flange to flange

- Blow or flush out pipe lines thoroughly before installing control valve
- Use a self-cleaning strainer to protect control valve and allied equipment
- Install stop valves in inlet and outlet lines so that control valve may be isolated when maintenance is to be performed
- Thermometers and or pressure gauges should be installed close to sensing point of controller so that controller may be adjusted properly and control performance monitored
- By-passes should be installed around valve if service is critical and system cannot be shut down during needed maintenance

**NOTE** A gauge of suitable range should be installed in connecting piping to port "A", "B" and "C" of rotary valve in order to check  $\Delta P$  across connections

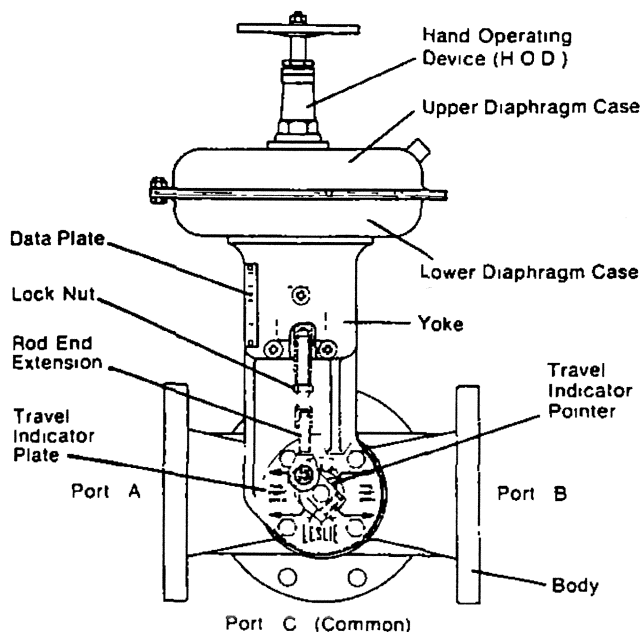
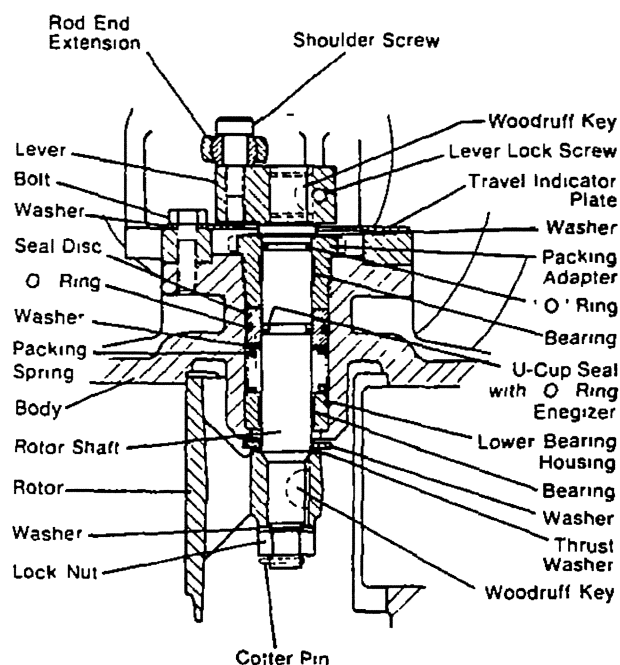


Figure 3 Valve Body With Actuator

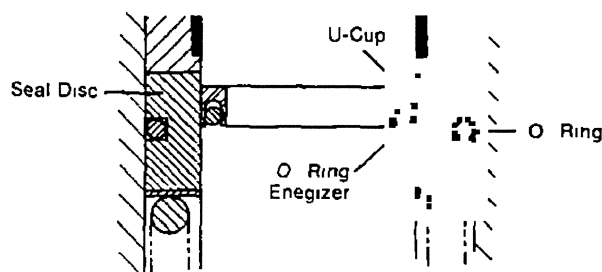
MAXIMUM ALLOWABLE OPERATING TEMPERATURE 220°F

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**Figure 4 Valve Body With View of Internal Parts**



**Figure 5 Expanded View of Seal Disc and U-Cup Seal**

MAXIMUM ALLOWABLE PRESSURE DROP	
VALVE SIZE	$\Delta P$
4 & 5	25 psi
6 8 & 10	15 psi
12 14 & 16	10 psi

MAXIMUM ALLOWABLE AIR PRESSURE TO ACTUATOR DIAPHRAGM 60 PSI

## OPERATION

- 1 Close inlet and outlet stop valves
- 2 Check for rated rotation of valve in relation to air pressure changes on actuator diaphragm. Travel indicator plate indicates rotation of rotor.
- 3 Place control valve in operation in accordance with instructions supplied with pressure or temperature controller.

## DISASSEMBLY

Close inlet and outlet stop valves and relieve pressure from piping involved. Remove tubing from actuator.

**IMPORTANT** NOTE POSITION OF LEVER IN RELATION TO TRAVEL INDICATOR PLATE SO THAT LEVER MAY BE LOCATED IN THIS SAME POSITION WHEN REASSEMBLING VALVE.

- 1 Remove shoulder screw from rod end extension. Remove bolts from yoke and lift off actuator.

**CAUTION** DO NOT ALLOW ROTOR TO FALL FROM ROTOR SHAFT AFTER LOCK NUT IS REMOVED.

- 2 Remove cotter pin from lower end of rotor shaft.
- 3 Using a socket wrench and extension remove lock nut and washer from rotor shaft. (Hold lever with wrench to prevent shaft from turning.)
- 4 Carefully remove rotor, thrust washer and washer from shaft. Remove Woodruff Key from shaft if key is loose.
- 5 Loosen lever lock screw and remove lever. Remove Woodruff Key from shaft. Before removing rotor shaft check for shaft bearing wear by moving shaft from side to side. Shaft should be a snug fit. Any excessive movement indicates that bearings are worn and should be replaced. Lift rotor shaft upward out of actuator end of body. If replacement is necessary due to U-Cup leakage, remove 'O' ring and U-Cup with 'O' ring energizer from shaft. Clean shaft recesses.

## 4 THRU 6 INCH SIZE VALVES ONLY

- 6 Remove washer. Unscrew packing adaptor with upper bearing from body. Remove seal disc with

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"O" ring, washer packing spring and lower bearing housing

#### 8 THRU 16 INCH SIZE VALVES ONLY

- 6a Remove washer packing flange, packing adaptor with upper bearing, seal disc with "O" ring, washer, packing spring and lower bearing housing

#### CLEANING

Clean all parts in an approved solvent and remove any incrustations from metal parts with 320 Grade Aluminum Oxide cloth. Bore of body must be clean and smooth. Replace any worn or damaged parts. It is recommended that all "O" rings and U-Cup seal be replaced with new parts. After cleaning, check bearings making sure they fit snugly in bearing recesses so as not to interfere or be damaged when rotor shaft is inserted down through bearings during reassembly.

#### REPLACEMENT OF ACTUATOR DIAPHRAGM

Remove compression from actuator adjusting spring. Remove nuts and bolts from upper diaphragm case. Lift off case and remove diaphragm. Position new diaphragm over disc. Replace upper diaphragm case and tighten bolts and nuts alternately and evenly.

#### ADJUSTMENT OF ACTUATOR SPRING PRELOAD

WITH NO PRESSURE IN VALVE BODY adjust actuator adjusting spring compression so that rotor just starts to move when 6 psig air is applied to diaphragm of actuator.

**NOTE** For complete Actuator Maintenance see Instruction 10/0 5 6 for Hand Operating Devices 10/0 5 10 for Direct Acting Actuators and 10/0 5 11 for Reverse Acting Actuators.

#### REASSEMBLY

- 1 Install lower bearing housing with bearing in body bore followed by packing spring and washer. Install a new "O" ring in rotor shaft upper groove.

#### 4 Thru 6 Inch Size Valves

- 2 Place washer over rotor shaft and push washer up over "O" ring until it rests against shoulder of shaft. Place threaded packing adaptor over shaft and push adaptor up over "O" ring till it touches washer.

#### 8 Thru 16 Inch Size Valves

- 2a. Place washer and packing flange over end of rotor shaft and move parts up over "O" ring. Install packing adaptor over end of shaft.
- 3 Cover Woodruff Key slot with a piece of adhesive tape. With "O" ring energizer in U-Cup, slide cup over shaft with lip seal end downward until seal enters shaft groove. Remove adhesive tape. DO NOT use any lubricant while installing U-Cup. After installation apply a small amount of Silicon grease to outside diameter of cup after it is in groove.
- 4 Install new "O" ring in seal disc groove. Slide packing adaptor toward U-Cup until U-Cup lip just enters adaptor bore then slide seal disc up over shaft. Push seal disc and adaptor upward as a unit until parts rest against washer. This method of installation allows U-Cup to enter seal disc bore without damaging lip seal.
- 5 Carefully lower rotor shaft with assembled parts into body bore. Screw packing adaptor into body threads and tighten or bolt packing flange to body.
- 6 Install Woodruff Keys in shaft grooves. Install lever over end of shaft in same position as when it was removed. Tighten lock screw.
7. Place washer followed by thrust washer over lower end of rotor shaft. Align Woodruff Key in shaft and install rotor in same position as when it was removed. Hold rotor in place and install washer and lock nut. Hold lever with wrench and tighten lock nut. Insert cotter pin through hole in rotor shaft. Spread end of pin to lock pin in place.
- 8 Replace actuator and tighten cap screws. Attach rod end to lever with shoulder screw and tighten screw.

**NOTE** If length of rod end was disturbed during maintenance it may be readjusted by loosening rod lock nut and with rotor and lever properly aligned the rod end may be shortened or lengthened by removing shoulder screw and screwing rod end either in or out of actuator stem threads until rotor covers port. Replace shoulder screw and tighten.

#### CHANGING VALVE ACTION

The valve action can be changed without removing the rotor or disturbing the line connections.

To reverse the action remove the lever and rotate the shaft 180°. Turn the lever over so that the lever keyway aligns with the shaft key. Tighten lever lock screw. The port that is open will be shown on the indicator plate.

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# instructions for

## 3-WAY ROTARY CONTROL VALVES 4" THROUGH 16" SIZE CLASSES RVK AND RVB

INSTALLATION, OPERATION, AND MAINTENANCE

### TROUBLE SHOOTING—3-WAY ROTARY VALVES

<b>Problem</b> Less than rated or no valve travel when proper air pressure is applied to actuator diaphragm	
<b>Possible Cause</b>	<b>Remedy</b>
1 No air signal or incorrect air signal to actuator diaphragm	Check controller and correct
2 Air leaks in tubing or connections	Check and correct
3 Ruptured actuator diaphragm	Replace diaphragm
4 Incorrect adjustment of rod end extension	Readjust in accordance with instructions
5 Dirt or foreign matter restricting rotor movement	Disassemble valve Clean and polish rotor and valve body
<b>Problem:</b> Incorrect port open when air is applied to actuator	
<b>Possible Cause</b>	<b>Remedy</b>
1 Valve assembled incorrectly	See "CHANGING VALVE ACTION"
<b>Problem:</b> Leakage around rotor shaft	
<b>Possible Cause</b>	<b>Remedy</b>
1 U-Cup worn or damaged This may be caused by excessive rotor shaft bearing wear	Replace U-Cup Check rotor shaft side movement Replace bearings as necessary
2 U-Cup O" ring energizer not installed	Install energizer in U-Cup
<b>Problem</b> Erratic movement of rotor although air signal to actuator diaphragm is stable	
<b>Possible Cause</b>	<b>Remedy</b>
1 Pressure drop across valve in excess of that allowed	See "MAXIMUM ALLOWABLE PRESSURE DROP" table

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